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| 09/639,684      | 08/15/2000  | Dennis H. Runnoc     | 14374.14            | 4147             |

7590 01/25/2005  
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EXAMINER

THOMAS, COURTNEY D

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

2882

DATE MAILED: 01/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/639,684

Applicant(s)

RUNNOE, DENNIS H.

Examiner

Courtney Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 8,57,59-81 and 83-94 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8,57,59-81 and 83-94 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claims 8, 57, 59-66, 78-81, 83 and 84-94** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, independent claims 8 and 78 (and dependent claim 87) attempt to define a structure of an emitter, describing the emitter as defining a cutout. Examiner concludes the recitation: "and the emitter defining a cutout" is ambiguous. Dependent claims 57, 59-66, 78-81 and 83 similarly suffer from this inherited deficiency.

3. Independent claim 84 is directed to an X-ray device comprising a vacuum enclosure and a target anode having a target surface being disposed within the vacuum enclosure. It is unclear how the target anode and target surface are to be "spaced apart from the vacuum enclosure." Dependent claims 85-94 similarly suffer from this inherited deficiency.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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5. Claims 67-70, 75, 78, 84-86 and 94 are rejected under 35 U.S.C. 102(b) as being anticipated by DeCou, Jr. et al. (U.S. Patent 5,264,801).

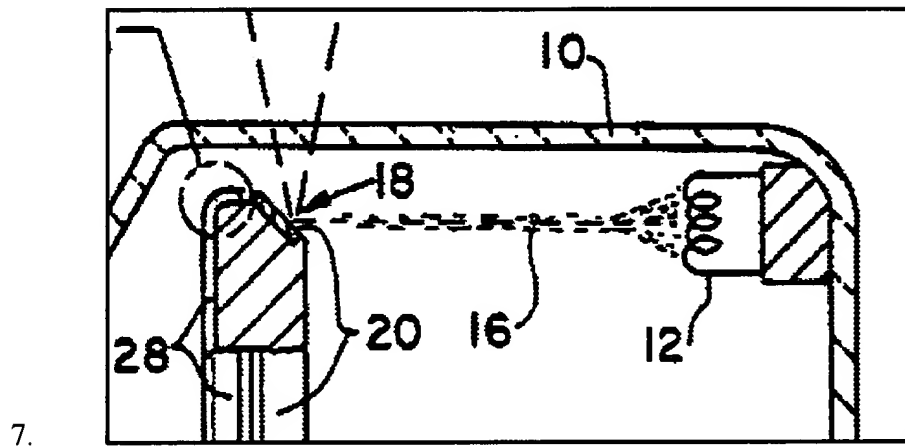
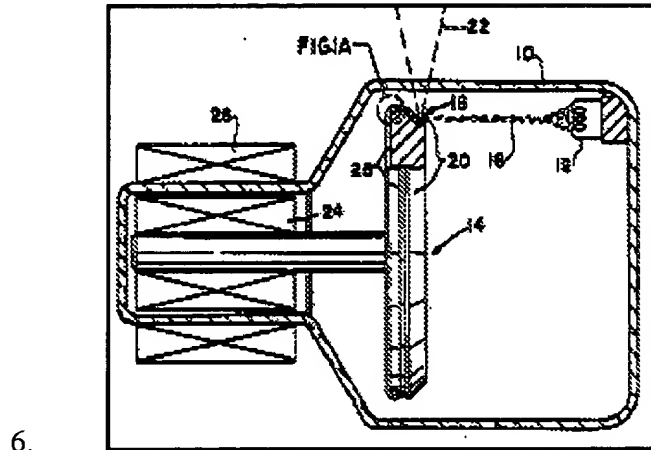


Figure 1 - U.S. Patent 5,264,801 to DeCou, Jr. et al.

8. As per claims 67 and 78, DeCou, Jr. et al. disclose an integral cathode, comprising: an emitter (12) comprising an emissive surface having a shape configured to direct a majority of electrons (16) emitted from spatially diverse locations on the emissive surface to a common focal point (18), the emitter being configured to receive a flow of electrical current such that thermionic emission of electrons from the emitter is facilitated (column 2, lines 61-65), and a support cartridge, providing structural support for the emitter (see Fig. 1, above).

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9. As per claims 68-70, 75, 86 and 94, DeCou, Jr. et al. disclose an integral cathode wherein the emissive surface is substantially comprises a single piece of material; wherein the emitter is substantially confined within the support cartridge; the emitter defines at least one cutout and wherein the support cartridge serves to substantially maintain the emitter in the shape (see Fig. 1 above).

10. As per claims 84 and 85, DeCou, Jr. et al. disclose an X-ray device comprising:

11. (a) a vacuum enclosure (10),

12. (b) a target anode (14) having a target surface and being substantially disposed with the vacuum enclosure;

13. (c) an integral cathode disposed within the vacuum enclosure and comprising:

14. (d) an emitter (12) comprising an emissive surface having a shape configured to direct a majority of electrons (16) emitted from spatially diverse locations on the emissive surface to a common focal point (18) proximate the target surface, the emitter being configured to receive a flow of electrical current such that thermionic emission of electrons from the emitter is facilitated (column 2, lines 61-65), and

15. (e) a support cartridge, providing structural support for the emitter (see Fig. 1, above) and

***Claim Rejections - 35 USC § 103***

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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17. Claims 73, 74, 90 and 91 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeCou, Jr. et al. (U.S. Patent 5,264,801).

18. As per claims 73, 74, 90, 91, DeCou, Jr. et al. do not explicitly disclose an integral cathode wherein the emitter is substantially composed of a refractory metal or doped with a dopant. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the integral cathode of DeCou Jr. et al., such that the emitter comprised a refractory material or doped with a dopant. One would have been motivated to make such a modification for the purpose of providing an emitter having good emissive characteristics and thermal stability for use in elevated temperature environments.

19. Claims 76, 77, 92 and 93 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeCou, Jr. et al. (U.S. Patent 5,264,801) in view of Knudsen et al. U.S. Patent 5,515,413.

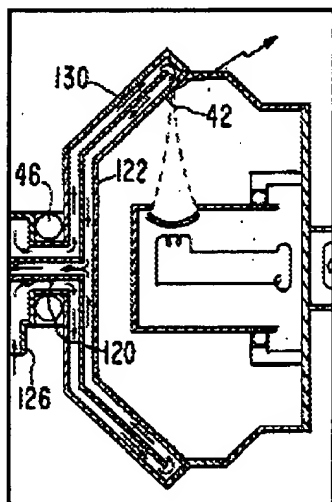
20. As per claims 76, 77, 92 and 93, DeCou, Jr. et al do not explicitly disclose an integral cathode wherein the support cartridge substantially comprises one of a ceramic material and a cathodically coated iron and further comprising an electrically conductive portion and a non-electrically conductive portion. It would have been obvious to a practitioner in the art to provide a support for an integral cathode wherein the support cartridge comprised electrically conductive portions to provide current to an attached emitter thereby facilitating thermionic emission therefrom and to also contain non-conductive portions to insulate conductive portions to prevent electron flow to surrounding components. One would have been motivated to make such a modification for the purpose of preventing electrical shorting of the device during operation through

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inadvertent contact with nearby conductive elements. Additionally, the selection of suitable/ superior insulating materials (i.e. ceramics (alumina, zirconia) glass, etc. for use in an elevated temperature environment) is a well-known practice/ technique in the x-ray tube art (see also Knudsen et al. U.S. Patent 5,515,413 - column 2, lines 32-61).

21. Claims 71, 72, 88 and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeCou, Jr. et al. (U.S. Patent 5,264,801) in view of Anderson (U.S. Patent 4,788,705).

22. As per claims 71, 72, 88 and 89, DeCou, Jr. et al do not explicitly disclose an integral cathode wherein the emissive surface is substantially concave in shape and comprises one of a parabolic arc and circular arc.



23.

Figure 5 - U.S. Patent 4,788,705 to Anderson

24. Anderson discloses an apparatus wherein the emissive surface of the emitter is substantially concave in shape and comprises one of a parabolic arc and circular arc (see Fig. 5 above).

25. It would have been obvious to modify the apparatus of DeCou, Jr. et al. such that it incorporated an emitter wherein the emissive surface of the emitter is substantially

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concave in shape. One would have been motivated to make such a modification so that electron emission is finely focused, due to the shape of the emitter thereby resulting in an increase in the resolving power of an X-ray apparatus as suggested by Anderson (see abstract; Fig. 5 above).

### ***Response to Arguments***

26. Applicant's arguments filed 12.09.04 have been fully considered but they are not persuasive. In particular, DeCou Jr., et al. (U.S. Patent 5,264,801) disclose an X-ray device comprising a vacuum enclosure (10), an integral cathode having an emitter (12), the emitter having a shape configured to direct a majority of electrons (16) emitted from spatially diverse locations on the emissive surface to a common focal point (18), the emitter configured to receive electrical current such that thermionic emission of electrons from the emitter is facilitated (not shown above - DeCou Jr., et al. disclose the emission of electrons upon the application of DC potential - see also column 2, lines 61-65) and a support cartridge (not numbered). Supporting references (Knudsen et al. U.S. Patent 5,515,413 and Anderson (U.S. Patent 4,788,705) are provided for their teachings of art recognized techniques of electron tube design, wherein discussions pertaining to the use/selection of materials for use in high temperature environments, design considerations for efficient beam generation, and radiation shielding are made available to artisans in the radiation art.

### ***Conclusion***

27. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).




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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (571) 272-2496. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER

Courtney Thomas CT  
Examiner  
Art Unit 2882